

REMARKS

Figures

The Drawings and Specification were previously amended by a Non-Final Office Action Response dated November 12, 2004. More specifically, a new Figure 5 was added and includes a cooling fan (or other forced-air cooling device) 510. Further, the Specification was amended to add a new paragraph after paragraph [0008] and changes were made to paragraph [0025] to include a discussion of cooling fan (or other forced-air cooling device) 510. Accordingly, Applicant respectfully requests removal of the objection to the Drawings.

Summary

Claims 15-21 and 25-38 stand in this application. Claims 1-15 have been canceled. Claim 15 is currently amended. New claims 25-38 have been added. No new matter has been added. Favorable reconsideration and allowance of the standing claims are respectfully requested

35 U.S.C. § 102

At page 3, paragraph 2 of the Office Action claims 15-19 stand rejected under 35 U.S.C. § 102 as being anticipated by Calhoun et al., United States Patent Number 4,351,388 (hereinafter "Calhoun"). Applicant respectfully traverses the rejection, and requests reconsideration and withdrawal of the anticipation rejection.

Although Applicant disagrees with the broad grounds of rejection set forth in the Office Action, Applicant has amended claim 15 in order to facilitate prosecution on the merits. Applicant submits that the amendments merely clarify, either expressly or impliedly, what was already present in the claims. Furthermore, Applicant submits that the amendments are not narrowing amendments and are not being made for reasons substantially related to patentability.

Applicant respectfully submits that to anticipate a claim under 35 U.S.C. § 102, the cited reference must teach every element of the claim. *See* MPEP § 2131, for example. Applicant submits that Calhoun fails to teach each and every element recited in claims 15-19 and thus they define over Calhoun. For example, with respect to claim 15, Calhoun fails to teach, among other things, the following language:

a first structure having a first thermal resistance and including particles having an average diameter greater than about 50 μm to convert some of the coolant from liquid to vapor;

a second structure around the first structure to wet the first structure with the coolant from multiple sides and having a second thermal resistance that is greater than the first thermal resistance

According to the Office Action, this language is disclosed by Calhoun at Figures 2 and 3.

Applicant respectfully disagrees.

Applicant respectfully submits that claim 15 defines over Calhoun. Calhoun at the given cite, in relevant part, states:

Heat is applied to the evaporator end of the envelope 11 causing the working fluid to evaporate from the thread grooves 17 at this end of the heat pipe. The vapor follows the thread grooves 17 circumferentially until it arrives at the axial vapor channel 23 and it travels in this channel through the transport or adiabatic section to the condenser end of the heat pipe, due to differential pressure. Heat is removed from the vapor at the condenser end of the heat pipe causing the vapor to

condense on the groove walls. The condensate travels to the screen sheath 15, passes through the sheath into the wick core 14, and moves to the evaporator end by capillary action, thereby completing the cycle.

As indicated above, Calhoun arguably discloses a heat pipe that relies on heat and differential pressure to vaporize the coolant and then condense the vapor. By way of contrast, the claimed subject matter discloses a first structure having a first thermal resistance and including particles having an average diameter greater than about 50 μm to convert some of the coolant from liquid to vapor and a second structure around the first structure to wet the first structure with the coolant from multiple sides and having a second thermal resistance that is greater than the first thermal resistance. Applicant respectfully submits that the office action fails to cite a teaching or suggestion within Calhoun to the difference in thermal resistance between the first and second structures. Further, Calhoun arguably discloses particles within the wick portion of the heat pipe (Elements 14 and 15, Figure 3). Calhoun fails to show the presence of particles having an average diameter greater than about 50 μm within the evaporator portion (boiling structure) of the heat pipe as disclosed by the claimed subject matter. Consequently, Calhoun fails to disclose all the elements or features of the claimed subject matter. Accordingly, Applicant respectfully requests removal of the anticipation rejection with respect to claim 15. Furthermore, Applicant respectfully requests withdrawal of the anticipation rejection with respect to claims 16-19, which depend from claim 15 and, therefore, contain additional features that further distinguish these claims from Calhoun.

At page 4, paragraph 1 of the Office Action claims 15-21 stand rejected under 35 U.S.C. § 102 as being anticipated by Kroliczek, United States Patent Number 6,564,860

(hereinafter "Kroliczek"). Applicant respectfully traverses the rejection, and requests reconsideration and withdrawal of the anticipation rejection.

Although Applicant disagrees with the broad grounds of rejection set forth in the Office Action, Applicant has amended claim 15 in order to facilitate prosecution on the merits. Applicant submits that the amendments merely clarify, either expressly or impliedly, what was already present in the claims. Furthermore, Applicant submits that the amendments are not narrowing amendments and are not being made for reasons substantially related to patentability.

Applicant respectfully submits that to anticipate a claim under 35 U.S.C. § 102, the cited reference must teach every element of the claim. *See* MPEP § 2131, for example. Applicant submits that Kroliczek fails to teach each and every element recited in claims 15-21 and thus they define over Kroliczek. For example, with respect to claim 15, Kroliczek fails to teach, among other things, the following language:

a first structure having a first thermal resistance and including particles having an average diameter greater than about 50 μm to convert some of the coolant from liquid to vapor;

a second structure around the first structure to wet the first structure with the coolant from multiple sides and having a second thermal resistance that is greater than the first thermal resistance

According to the Office Action, this language is disclosed by Kroliczek at Table 1 and Figure 16. Applicant respectfully disagrees.

Applicant respectfully submits that claim 15 defines over Kroliczek. Kroliczek at the given cite, in relevant part, states:

The wick 534 is embodied to include the liquid superheat tolerance aspects described above, with the compromise of two fluid paths through the wick to

permit flow of liquid from the return lines 552, 554 into the reservoir 540. To the extent practicable, these fluid paths through the wick 534 are kept to a minimum size and are spaced apart from the vapor grooves 532. Almost all flow of liquid through the wick 534 originates at the top surface of the wick (i.e., at the interface between the reservoir 540 and the wick 534), not from the liquid return channels.

As indicated above, Kroliczek arguably discloses a capillary wick that may be used within an evaporator. By way of contrast, the claimed subject matter discloses a first structure having a first thermal resistance and including particles having an average diameter greater than about 50 μm to convert some of the coolant from liquid to vapor and a second structure around the first structure to wet the first structure with the coolant from multiple sides and having a second thermal resistance that is greater than the first thermal resistance. Applicant respectfully submits that the office action fails to cite a teaching or suggestion within Kroliczek to the difference in thermal resistance between the first and second structures. Further, Kroliczek arguably discloses pores only within the wick portion of the heat pipe. Kroliczek fails to show the presence of particles having an average diameter greater than about 50 μm within the boiling structure (first structure) of the heat pipe as disclosed by the claimed subject matter. Consequently, Kroliczek fails to disclose all the elements or features of the claimed subject matter. Accordingly, Applicant respectfully requests removal of the anticipation rejection with respect to claim 15. Furthermore, Applicant respectfully requests withdrawal of the anticipation rejection with respect to claims 16-19, which depend from claim 15 and, therefore, contain additional features that further distinguish these claims from Kroliczek.

Claim 20 contains features similar to those recited in claim 15. Therefore, Applicant respectfully submits that claim 20 is not anticipated and is patentable over the

Kroliczek for reasons analogous to those presented with respect to claim 15.

Accordingly, Applicant respectfully requests removal of the anticipation rejection with respect to claim 20. Furthermore, Applicant respectfully requests withdrawal of the anticipation rejection with respect to claim 21 which depends from claim 20, and therefore contain additional features that further distinguish this claim from Kroliczek.

At page 4, paragraph 2 of the Office Action claims 15-18 stand rejected under 35 U.S.C. § 102 as being anticipated by Rosenfeld et al., United States Patent Number 5,076352 (hereinafter "Rosenfeld"). Applicant respectfully traverses the rejection, and requests reconsideration and withdrawal of the anticipation rejection.

Although Applicant disagrees with the broad grounds of rejection set forth in the Office Action, Applicant has amended claim 15 in order to facilitate prosecution on the merits. Applicant submits that the amendments merely clarify, either expressly or impliedly, what was already present in the claims. Furthermore, Applicant submits that the amendments are not narrowing amendments and are not being made for reasons substantially related to patentability.

Applicant respectfully submits that to anticipate a claim under 35 U.S.C. § 102, the cited reference must teach every element of the claim. *See* MPEP § 2131, for example. Applicant submits that Rosenfeld fails to teach each and every element recited in claims 15-18 and thus they define over Rosenfeld. For example, with respect to claim 15, Rosenfeld fails to teach, among other things, the following language:

a first structure having a first thermal resistance and including particles having an average diameter greater than about 50 μm to convert some of the coolant from liquid to vapor;

a second structure around the first structure to wet the first structure with the coolant from multiple sides and having a second thermal resistance that is greater than the first thermal resistance

According to the Office Action, this language is disclosed by Rosenfeld at Table 1 and

Figure 16. Applicant respectfully disagrees.

Applicant respectfully submits that claim 15 defines over Rosenfeld. Rosenfeld at the given cite, in relevant part, states:

Capillary structure 18 is essentially formed by bonding the separator granules to one perforated sheet and then placing the second perforated sheet on the separator granules and attaching the sheets together. One method of accomplishing this is by simply sprinkling plastic coated metal granules upon one sheet of wire cloth, heating the assembly to bond the metal granules in place on the sheet of wire cloth, and then placing the other sheet of wire cloth on top of the metal granules and welding the edges of the wire cloth layers together. After capillary structure 18 is constructed, it can easily be rolled into a cylinder so that it will fit within heat pipe 10 as shown in FIG. 1.

As indicated above, Rosenfeld arguably discloses a capillary wick that may be used within a heat pipe. By way of contrast, the claimed subject matter discloses a first structure having a first thermal resistance and including particles having an average diameter greater than about 50 μm to convert some of the coolant from liquid to vapor and a second structure around the first structure to wet the first structure with the coolant from multiple sides and having a second thermal resistance that is greater than the first thermal resistance. Applicant respectfully submits that the office action fails to cite a teaching or suggestion within Rosenfeld to the difference in thermal resistance between the first and second structures. Further, Rosenfeld arguably discloses pores only within the wick portion of the heat pipe. In fact, Rosenfeld only discloses a wick that may be used within a heat pipe. The claimed subject matter discloses two structures, only one of

which may be a wick. Rosenfeld fails to show the presence of particles having an average diameter greater than about 50 μm within the boiling structure (first structure) of the heat pipe as disclosed by the claimed subject matter. Consequently, Rosenfeld fails to disclose all the elements or features of the claimed subject matter. Accordingly, Applicant respectfully requests removal of the anticipation rejection with respect to claim 15. Furthermore, Applicant respectfully requests withdrawal of the anticipation rejection with respect to claims 16-18, which depend from claim 15 and, therefore, contain additional features that further distinguish these claims from Rosenfeld.

New claims 25-38 are similar to previously canceled claimed 1-14. Canceled claims 1-14 were rejected on several grounds in an Office Action dated March 7, 2007. Applicant respectfully submits that new claims 25-38 define over the cited references.

At page 4, paragraph 2 of the Office Action dated March 7, 2007, claims 1, 4, 5 and 9 (corresponding to current claims 25, 28, 29 and 33, respectively) stand rejected under 35 U.S.C. § 102 as being anticipated by Thomas, United States Patent Number 6,167,948 (hereinafter "Thomas"). Applicant respectfully traverses the rejection, and requests reconsideration and withdrawal of the anticipation rejection.

Applicant respectfully submits that to anticipate a claim under 35 U.S.C. § 102, the cited reference must teach every element of the claim. *See* MPEP § 2131, for example. Applicant submits that Thomas fails to teach each and every element recited in claims 25, 28, 29 and 33 and thus they define over Thomas. For example, with respect to claim 25, Thomas fails to teach, among other things, the following language:

a boiling structure formed of a first porous material to convert a coolant from liquid to vapor and having a first thermal resistance; and

a wick structure formed of a second porous material surrounding the boiling structure to bring the coolant to the boiling structure and having a second thermal resistance that is higher than the first thermal resistance of the boiling structure.

According to the Office Action, this language is disclosed by Thomas at Figures 1 and 2.

Applicant respectfully disagrees.

Applicant respectfully submits that claim 25 defines over Thomas. Thomas at the given cite, in relevant part, states:

The planar capillary fluid path 50 executes a wicking operation associated with heat pipes. However, unlike existing heat pipes, the wicking operation does not rely upon a separate structure, such as a screen. Instead, the planar capillary fluid path 50 is formed out of the body of the device. Thus, the expense associated with prior art heat pipes is avoided. In addition, the relatively high hydrodynamic resistance of a discrete wick structure is avoided.

As indicated above, Thomas arguably discloses a planar capillary fluid path. By way of contrast, the claimed subject matter discloses a boiling structure formed of a first porous material to convert a coolant from liquid to vapor and having a first thermal resistance; and a wick structure formed of a second porous material surrounding the boiling structure to bring the coolant to the boiling structure and having a second thermal resistance that is higher than the first thermal resistance of the boiling structure. As indicated above, Thomas clearly does not contain a wick structure. The disclosure of Thomas explicitly states that, "However, unlike existing heat pipes, the wicking operation does not rely upon a separate structure." Consequently, Thomas fails to disclose all the elements or features of the claimed subject matter. Accordingly, Applicant respectfully requests removal of the anticipation rejection with respect to claim 25. Furthermore, Applicant respectfully requests withdrawal of the anticipation rejection with respect to claims 26-

32, which depend from claim 25 and, therefore, contain additional features that further distinguish these claims from Thomas.

Claim 33 contains features similar to those recited in claim 25. Therefore, Applicant respectfully submits that claim 33 is not anticipated and is patentable over the Thomas for reasons analogous to those presented with respect to claim 25. Accordingly, Applicant respectfully requests removal of the anticipation rejection with respect to claim 33. Furthermore, Applicant respectfully requests withdrawal of the anticipation rejection with respect to claims 34-38 that depend from claim 33, and therefore contain additional features that further distinguish this claim from Thomas.

At page 3, paragraph 2 of the Office Action dated March 7, 2007, claims 1, 5 and 8 (corresponding to current claims 25, 29, 32, respectively) stand rejected under 35 U.S.C. § 102 as being anticipated by Zhou, United States Patent Number 6,994,151 (hereinafter "Zhou"). Applicant respectfully traverses the rejection, and requests reconsideration and withdrawal of the anticipation rejection.

Applicant respectfully submits that to anticipate a claim under 35 U.S.C. § 102, the cited reference must teach every element of the claim. *See* MPEP § 2131, for example. Applicant submits that Zhou fails to teach each and every element recited in claims 25, 28, 29 and 33 and thus they define over Zhou. For example, with respect to claim 25, Zhou fails to teach, among other things, the following language:

a boiling structure formed of a first porous material to convert a coolant from liquid to vapor and having a first thermal resistance; and

a wick structure formed of a second porous material surrounding the boiling structure to bring the coolant to the boiling structure and having a second thermal resistance that is higher than the first thermal resistance of the boiling structure.

According to the Office Action, this language is disclosed by Zhou at Figures 2A and 2B.

Applicant respectfully disagrees. Zhou arguably discloses a heat exchanger interface (103) in Figures 2A and 2B. By way of contrast, the claimed subject matter discloses a boiling structure formed of a first porous material to convert a coolant from liquid to vapor and having a first thermal resistance and a wick structure formed of a second porous material surrounding the boiling structure to bring the coolant to the boiling structure and having a second thermal resistance that is higher than the first thermal resistance of the boiling structure. As indicated above, Zhou clearly does not contain a boiling structure formed of a porous material. Further, Zhou fails to disclose a wick structure formed of porous material that surrounds a boiling structure. Consequently, Zhou fails to disclose all the elements or features of the claimed subject matter.

Accordingly, Applicant respectfully requests removal of the anticipation rejection with respect to claim 25. Furthermore, Applicant respectfully requests withdrawal of the anticipation rejection with respect to claims 29 and 32, which depend from claim 25 and, therefore, contain additional features that further distinguish these claims from Zhou.

35 U.S.C. § 103

At page 4, paragraph 2 of the Office Action dated March 7, 2007 claims 2, 3, 6-8, 10 and 12-14 (current claims 26, 27, 30-32, 34 and 36-38, respectively) stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Thomas or Zhou. Applicant respectfully traverses the rejection, and requests reconsideration and withdrawal of the obviousness rejection.

The Office Action has failed to meet its burden of establishing a *prima facie* case of obviousness. According to MPEP § 2143, three basic criteria must be met to establish a *prima facie* case of obviousness. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on applicant's disclosure. *In re Vaack*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). See MPEP 706.02(j).

Applicant respectfully submits that based upon the remarks above regarding the 102 rejections, Thomas or Zhou, whether taken alone or in combination fail to teach or suggest all claim limitations of claims 26, 27, 30-32, 34 and 36-38. Applicant, therefore, respectfully requests the removal of the obviousness rejection with respect to these claims.

Conclusion

For at least the above reasons, Applicant submits that claims 15-21 and 25-38 recite novel features not shown by the cited references. Further, Applicant submits that the above-recited novel features provide new and unexpected results not recognized by the cited references. Accordingly, Applicant submits that the claims are not anticipated nor rendered obvious in view of the cited references.

Applicant does not otherwise concede, however, the correctness of the Office Action's rejection with respect to any of the dependent claims discussed above.

Accordingly, Applicant hereby reserves the right to make additional arguments as may be necessary to further distinguish the dependent claims from the cited references, taken alone or in combination, based on additional features contained in the dependent claims that were not discussed above. A detailed discussion of these differences is believed to be unnecessary at this time in view of the basic differences in the independent claims pointed out above.

It is believed that claims 15-21 and 25-38 are in allowable form. Accordingly, a timely Notice of Allowance to this effect is earnestly solicited.

The Examiner is invited to contact the undersigned at 724-933-9338 to discuss any matter concerning this application.

The Office is hereby authorized to charge any additional fees or credit any overpayments under 37 C.F.R. § 1.16 or § 1.17 to deposit account 50-4238.

Respectfully submitted,

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John F. Kacvinsky, Reg. No. 40,040
Under 37 CFR 1.34(a)

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